# IRAS 20050+2720
Anatomy of a young stellar cluster

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We present results of our multiwavelength study of IRAS 20050+2720, a young stellar cluster, which is thought to be located at 700 pc (Wilking et al, 1989). IRAS 20050+2720 displays an exceptionally low 24 micron background, because no massive stars are present. We concentrate on Chandra and Spitzer data and compare cluster properties of an IR sample (as previously presented by Guthermuth et al. 2009) and an X-ray selected sample. Compared to previous works the IR coverage has been extended with new observations. Foreground X-ray sources are separated with optical photometry and we treat the remaining disk-less sources as the class III population of the cluster. It turns out, that the class III sources are much less clustered than class I and II sources.

3.6 μm
4.5 μm
8.0 μm
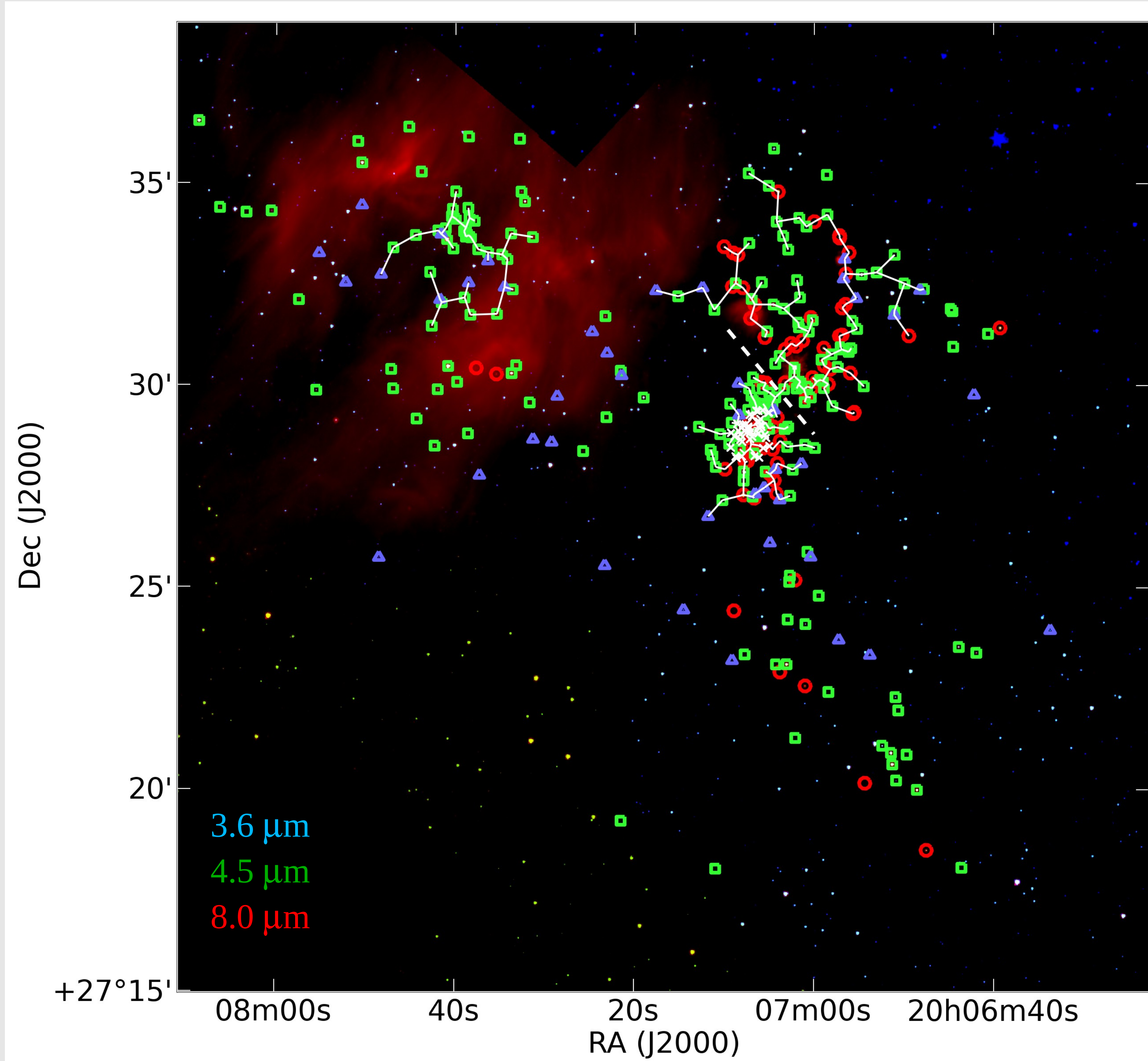
Class I and II sources are identified by their IRAC and MIPS colors (Guthermuth et al., 2009); class III sources by their X-ray emission. We use optical color-magnitude diagrams to exclude foreground X-ray sources.

The figure on the left shows the distribution of the sources.
O - Class I
□ - Class II
Δ - Class III
X - YSO (X-ray detection only)

White lines mark out two cores that we identify with a minimum spanning tree (MST) analysis. The dashed white line shows a suggestive way to separate the western core into two parts (North: low stellar density and South: high stellar density).
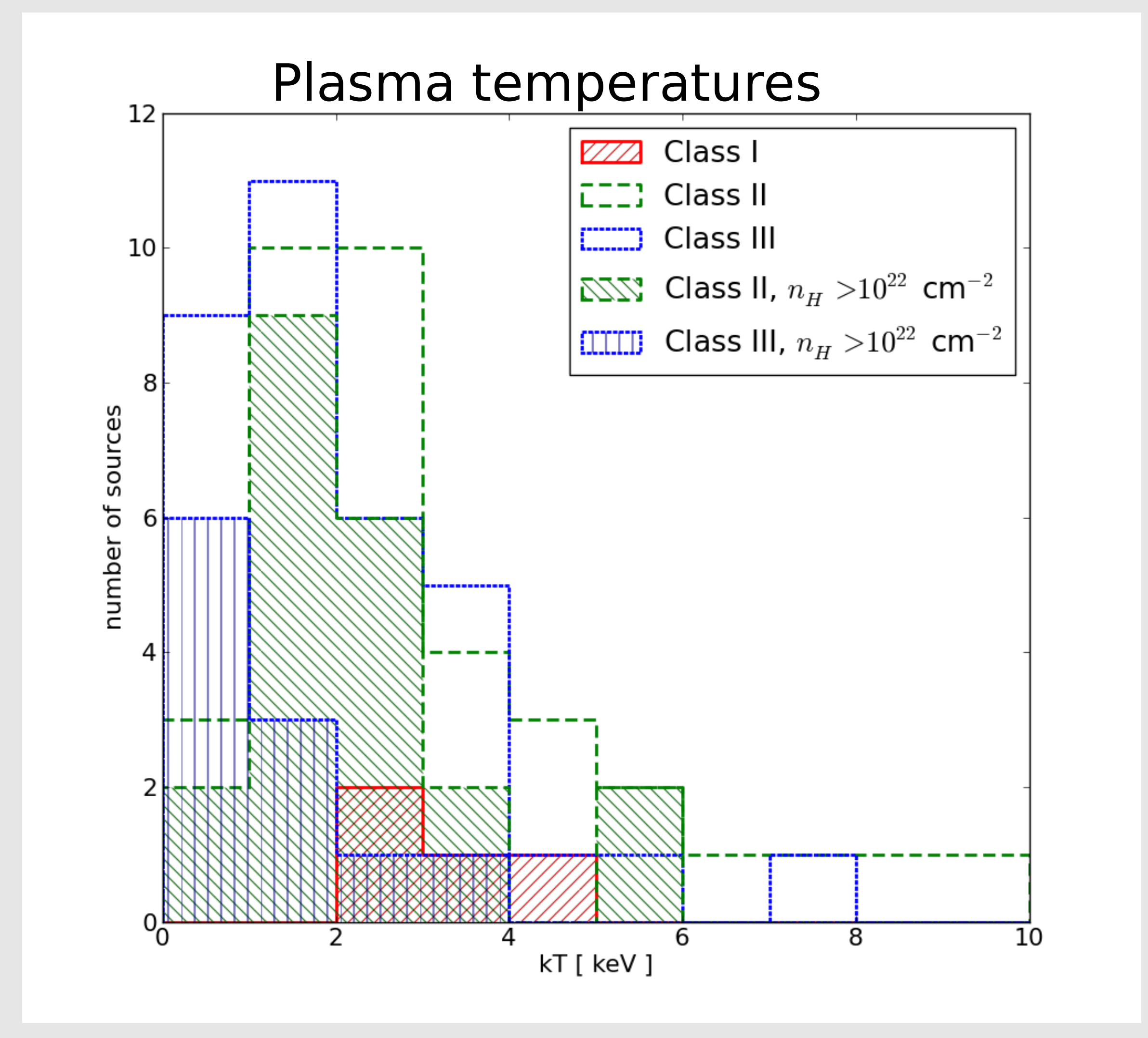

Branch length distribution

Legend: Class I, Class II, Class III, All YSOs
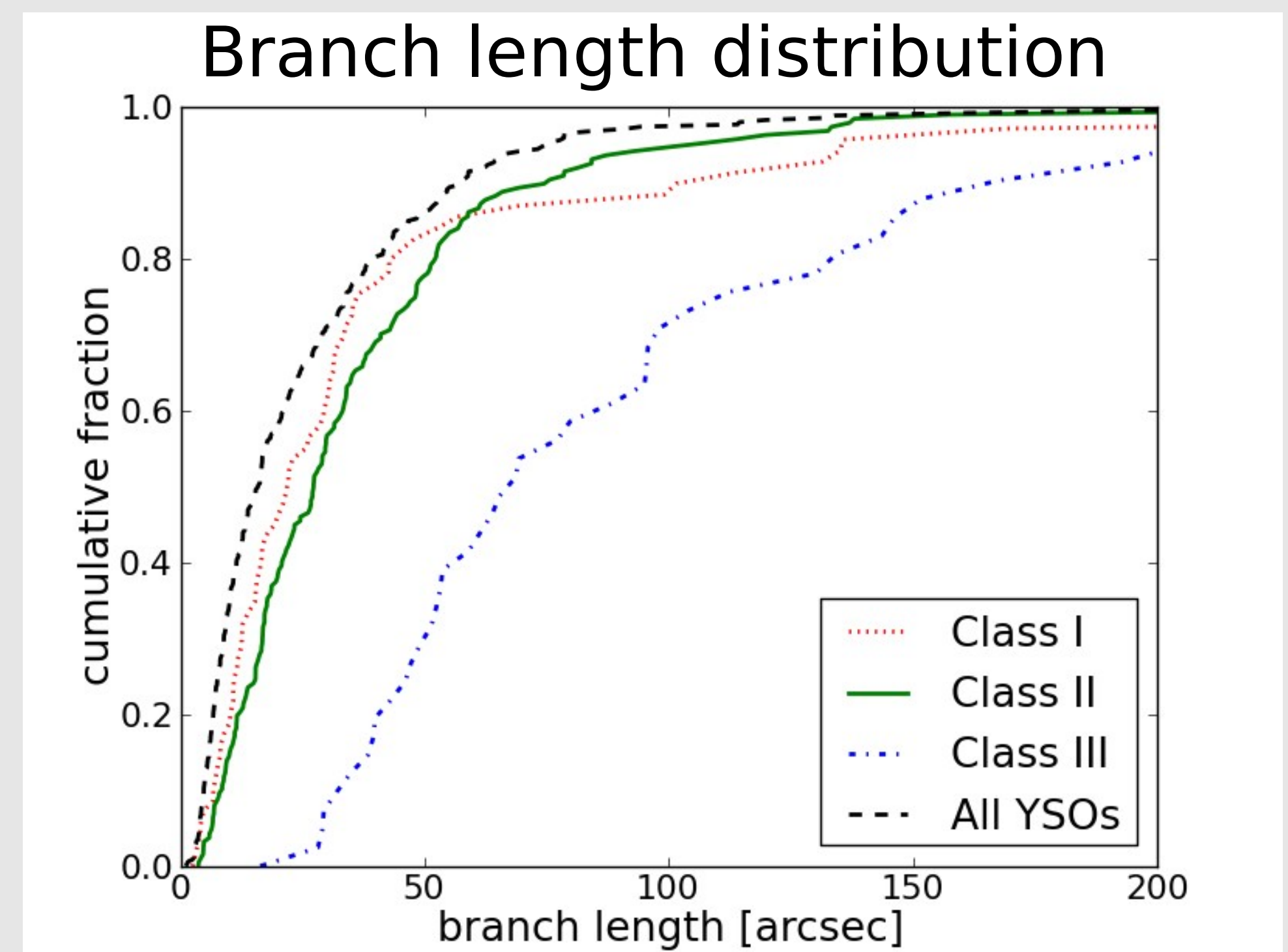
Number of detected Class I, II and III sources

Class	I	II	III
subcore East	0	31	6
subcore West – North	21	41	12
subcore West – South	29	54	7
total	70	185	42

Absorbing column densities

Legend: Class I, Class II, Class III
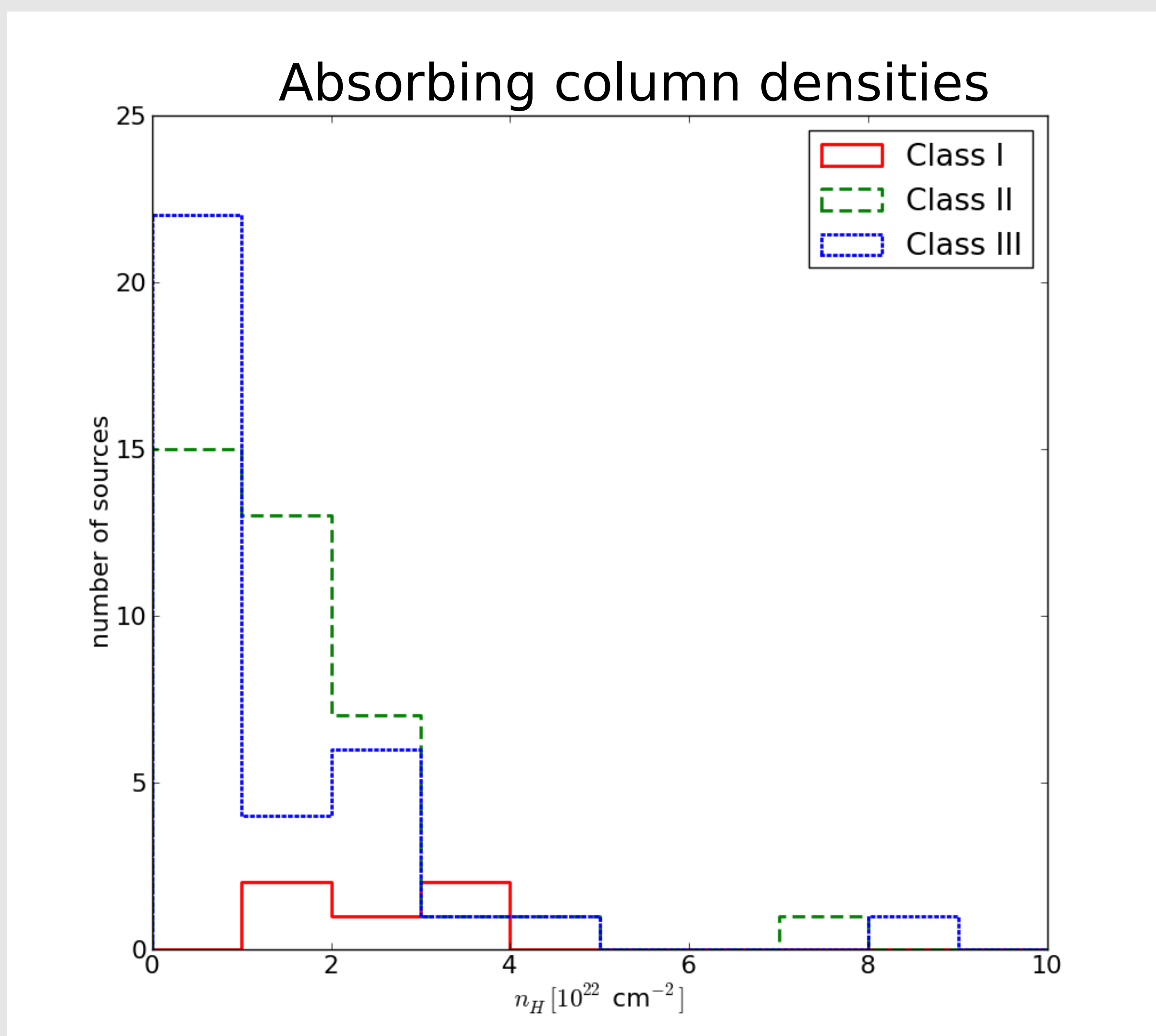
Distribution of absorbing column density (left) and plasma temperature (right) for class I, II and III sources, which are detected in X-rays. Class I objects are most embedded and they are also hotter.
The right figure shows the full sample of all detected sources and also a subsample of class II and III objects (hatched histograms) with similar absorbing column densities as the class I sources. Still, class I sources are hotter. Thus, this is not a bias introduced by the higher absorbing column densities.

Plasma temperatures

Legend: Class I, Class II, Class III, Class II, $n_H > 10^{22}$ cm^{-2}, Class III, $n_H > 10^{22}$ cm^{-2}